REMARKS/ARGUMENTS

The final office action of December 27, 2005 has been carefully reviewed and these remarks are responsive thereto. Claims 1-14 and 17-43 are pending. Claims 1-10, 12, 13 and 17-41 stand rejected. Applicant herein amends claims 21 and 39-43 and cancels claim 38.[1]

Claims Indicated As Allowable

The office action objected to claims 11, 41 and 42, but further indicated that those claims would be allowable if rewritten in independent form. Applicant acknowledges with thanks the indication of allowable subject matter. For the reasons set forth herein, however, it is believed that all of the pending claims should be allowed.

Arguments In Support of Patentability

At the outset, Applicant recognizes that these remarks are somewhat lengthy. Unfortunately, the complexity (and length) of the cited references, as well as the office action's application of those references to Applicant's claims, warrants detailed discussion. If the Examiner would be aided by a telephone (or in-person) discussion of the applied references and the points raised herein, or if Applicant has misunderstood any of the positions taken in the office action, Applicant encourages the Examiner to contact the undersigned representative.

Claim 1

The office action rejected claim 1 under 35 U.S.C. § 102(b) based on U.S. Patent 5,394,473 (Davidson). As explained below, Davidson fails to teach or suggest all features of claim 1. For example, step (c) of claim 1 recites "analyzing the transform coefficients of the sequence of encoded audio data intervals in the sequence so as to identify encoded transient audio data intervals, each of the encoded transient audio data intervals including a short transient signal having first transient signal characteristics." In its treatment of this part of claim 1, the office action applied Davidson to an earlier version of claim 1:

[1] Claim 21 is amended to include the features of dependent claim 38. Claims 39-41 previously depended from claim 21, and have been rewritten to include the features of claim 21 and be independent in form. Claims 42 and 43 are amended to correct a minor error.

> "analyzing said sequence of encoded audio data intervals to identify at least one encoded transient audio data interval, said encoded transient audio data interval including a short transient signal having first transient signal characteristics" as analyzing transient signals on a short term basis (col. 22 lines 4-20);

Office action at page 3. The office action appears to have applied Davidson to the version of claim 1 prior to Applicant's September 30, 2005 Amendment. This is significant, as the above-quoted portion of the office action overlooks a feature of claim 1 not found in Davidson. Specifically, Davidson does not teach or suggest analyzing the transform coefficients to identify transient audio data intervals.

Instead, Davidson very clearly describes searching for "transients" before any transform coefficients are generated:

> The wideband audio signals are sampled, quantized, and grouped into time-domain signal sample blocks N samples in length. A signal analyzer evaluates the current signal sample block to determine an appropriate transform, block length, and analysis-window function to optimize coding performance. In this preferred embodiment *the signal analyzer is a transient-signal detector that determines if any signal transient is present* which requires the encoder to use shorter block lengths to avoid audible temporal distortion. Sample blocks with such transients are subdivided into sample subblocks of optimum length to preserve sufficient transform frequency selectivity yet insure psychoacoustic masking of coding distortion caused by the transient. *Each sample block, whether of normal or of reduced length, is weighted by an analysis-window function chosen according to the output of the transient detector.* ***Frequency-domain transform coefficients are then generated in response to the analysis-window weighted time-domain signal sample block*** by a discrete forward transform selected according to the output of the transient detector. Information needed to define the signal sample block length, analysis-window function, and forward transform used by the encoder is passed to the decoder.

Davidson, col. 10, lines 25-52 (emphasis added).

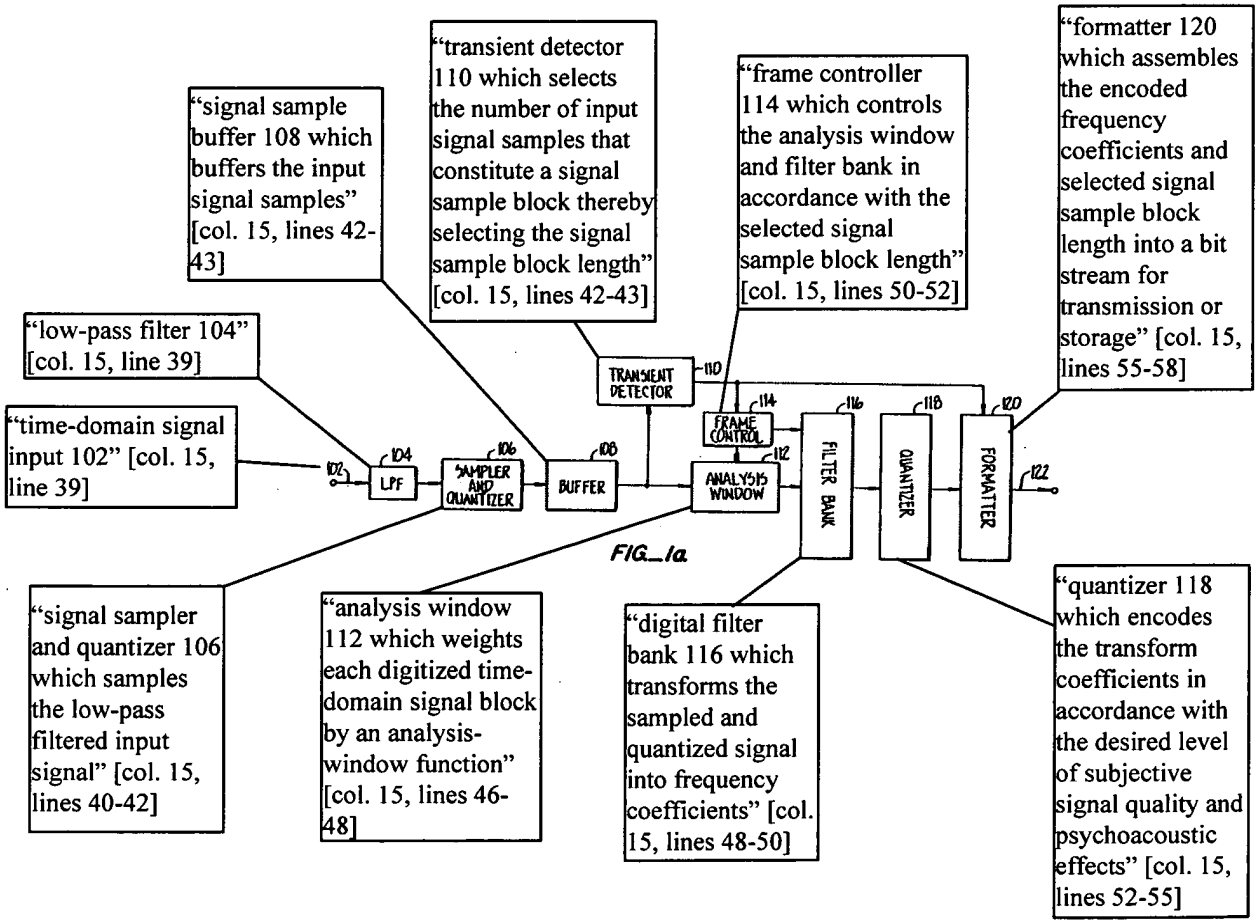
Other portions also make clear that Davidson teaches detection of transients prior to generation of transform coefficients. For example:

> The third section of the transient detector is a peak amplitude detector. The *time-domain* signal sample with the largest

magnitude is identified for each subblock in all hierarchical levels within the current subframe.

Col. 23, lines 31-35 (emphasis added). As the above quote explains, Davidson teaches transient detection in the time domain. As also stated by Davidson (and as known in the art), transform coefficients are created when going from the time domain to the frequency domain: "[t]ransform coding may be implemented by any of several time-domain to frequency-domain discrete transforms... " Col. 2, lines 61-64.

Perhaps the clearest description is provided with regard to Davidson Fig. 1a, "a preferred embodiment" of an encoder. Davidson Fig. 1a is reproduced below with annotations (directly quoting the Davidson specification) describing each block.



As clearly shown above, transient detector 110 provides input to frame control 114, which provides input to analysis window 112, which *then* provides input to filter bank 116. "Frequency coefficients" are generated in filter bank 116. The input to transient detector 110 is from buffer 108, which is clearly prior to filter bank 116.

The Davidson portion cited by the office action (col. 22, lines 4-20) does not teach analyzing transform coefficients to identify transient audio data intervals. The very first sentence of that portion states that "the transient detector monitors the input signal for rapid changes in amplitude and selects short signal sample blocks when sufficiently large changes in amplitude are detected." Col. 22, lines 4-7. As previously stated, however, the selection of block lengths occurs prior to generating transform coefficients. The next sentence indicates why sample block lengths are relevant to transform encoding: "quantization errors will cause a discrete transform coder to smear spectral components of transient signals throughout the signal sample block interval." Col. 22, lines 7-10. Davidson describes subdividing these blocks in order to minimize the distortion resulting from such smearing: "[t]he transient detector may select higher temporal resolution in exchange for poorer transform filter bank selectivity by adaptively selecting a shorter block length when it determines that a shorter block is required to insure temporal psychoacoustic masking of transient signal distortion artifacts." Col. 20, lines 24-29. If a transform decoder is to use shorter blocks when transform encoding transients, those transients must be identified before the transform encoding is performed.

Claims 2-10, 30 and 31

The office action also rejected claims 2-10, 30 and 31 under § 102(b) based on Davidson. These claims depend from claim 1 and are allowable for at least the same reasons as claim 1, as well as because of other features recited in these claims. For example, claim 5 recites "wherein step (c) comprises, as to each of the encoded audio data intervals in the sequence, performing a frequency analysis on the transform coefficients to detect the short transient signal." The office action again appears to have applied Davidson to an earlier version of claim 5:

As per claim 5, Davidson (5394473) teaches:

"wherein said step of analyzing comprises the step of performing a frequency analysis on said transform coefficients to detect a short transient signal" as short term block transform coefficients (col. 22 lines 8-35; col. 24 lines 30-35).

Office action at page 5. In any event, the portions of Davidson cited by the office action do not teach or suggest performing a frequency analysis on transform coefficients to detect a short transient signal. Davidson col. 22, lines 8-35 are generally discussed above in connection with claim 1. Col. 24, lines 30-35 are reproduced below, and are completely silent regarding performance of frequency analysis on transform coefficients:

always greater than one. T_{Dj} represents the decay
30 threshold for level j and is always less than one. Two sets of values for these thresholds are shown in Tables III and IV. If the ratio of peak amplitudes crosses either threshold, the transient detector will select a shorter signal sample block length. This adaptive process is
35 performed by stage three and is described in the following paragraphs.

Claim 20

The office action also rejected independent claims 20 under § 102(b) based on Davidson. Claim 20 recites "a transient detector for identifying, by analysis of frequency domain transfer coefficients of the coded audio data intervals, at least one of the coded audio data intervals corresponding to an audio data interval having a short transient signal." As set forth above, Davidson simply does not teach analyzing frequency domain transfer coefficients to identify transients. The portion of Davidson asserted by the office action as teaching this feature (col. 22, line 4-20) is addressed above in conjunction with claim 1.

In the Response to Arguments section on page 13, the office action states:

> As per applicants arguments that Davidson does not teach frequency domain transfer [sic, transform] coefficients, examiner disagrees and reiterates the rejection noted above with respect to claim 20.

Applicant did not assert that Davidson fails to teach frequency domain transfer coefficients. Instead, Applicant previously stated that Davidson fails to teach *analyzing* frequency domain transform coefficients *to identify transients*:

> additional features recited in those claims. For example, claim 30 recites analyzing the frequency domain transform coefficients of a sequence of encoded audio data intervals to identify encoded transient audio data intervals. Davidson does not teach this feature. Instead, Davidson teaches detection of transients in the time domain, i.e., prior to transform encoding to the frequency domain. As shown by Davidson Fig. 1a (reproduced below), transient detector 110 receives output from buffer 108 and provides input to frame control 114 and to formatter 120.

September 30, 2005 Amendment at page 16.

Claim 12

The office action rejected independent claim 12 under 35 U.S.C. § 102(e) based on U.S. Patent 6,597,961 (Cooke). Cooke fails to teach or suggest all features of claim 12. In particular, claim 12 recites the step of "replacing transform coefficients of the defective transient intervals with transform coefficients from received transient intervals not identified as defective." In other words, claim 12 recites taking the actual coefficients from certain intervals and using those actual coefficients in defective intervals ("replacing transform coefficients ... with coefficients from received intervals").

Cooke teaches generating "synthetic" frames by interpolation. This is not the same as the replacing step of claim 12. In other words, claim 12 recites taking the actual coefficients from certain intervals and using those actual coefficients in defective intervals ("replacing transform coefficients ... with coefficients from received intervals ..."). Cooke requires, e.g., summing samples from previous and next frames and dividing by 2 (see col. 8, lines 35-41) or multiplying samples in a previous (or next) frame by 0.75 (see col. 9, lines 8-25).

In the Response to Arguments section on page 13, the office action states:

> As per applicant's arguments that Cooke does not teach the recited limitations pertaining to the type of coefficient transform replacement, examiner argues that the replacement is a representation of non-defective interpolated information.

Applicant respectfully submits that this ignores the clear language of claim 12.

Claims 13, 14, 17-19 and 32-36

The office action also rejected claims 13, 14, 17-19 and 42-36 under § 102(e) based on Cooke. These claims depend from claim 12 and are allowable for at least the same reasons as claim 12, as well as because of other features recited in these claims. For example, claim 19 recites that step (d) comprises, as to each of the defective transient intervals,

> (d1) matching a window type of the defective transient interval with a window type of a received transient interval not identified as defective, and
>
> (d2) replacing transform coefficients of the defective transient interval with transform coefficients from the matching received non-defective transient interval.

Cooke simply does not teach this. The office action cites to Cooke col. 5, lines 60-64, and refers to "matching the bit field with a predetermined value associated with the transform that was used during the encoding process ... that is, the bit field pattern contains information as to which transform was used, and the corresponding transform is executed on the decoding end[.]" Office action at page 9. Even if one were to argue that Cooke teaches reading a bit field in an audio frame to identify the type of transform used, this has nothing to do with the way in which the Cooke system corrects for lost frames. When there is a "lost frame," the Cooke system does not generate a replacement frame based on a window type (or other characteristic) of that lost frame. Instead, the Cooke system evaluates characteristics of the frames before and after the lost frame. See Cooke Fig. 9 and corresponding description. For example, a lost frame may or may not correspond to audio data having a transient. In either case, however, the interpolation used to generate a "synthetic" frame is based on whether or not there is a transient in the next and/or in the preceding frame.

Claim 32 recites that step (d) comprises, as to each of the defective transient intervals,

> (d1) matching the beat type of the defective transient interval with the beat type of a non-defective received transient interval, and
>
> (d2) replacing transform coefficients of the defective transient interval with transform coefficients from the matching non-defective received transient interval.

As indicated above, the Cooke system does not generate a replacement frame based on a beat type (or other characteristic) of a lost frame. Instead, the Cooke system evaluates characteristics of the frames before and after the lost frame.

Claim 35 recites, as to each of the defective transient intervals,

(e1) inversely transforming the mid-frequency band replaced coefficients to a time domain component,

(e2) inversely transforming the low-frequency and high-frequency band replaced coefficients to a time domain component, and

(e3) constructing a replacement signal in the time domain corresponding to the defective transient interval by weighting and combining the time domain components of steps (e1) and (e2).

Cooke does not teach these features. Although Cooke does refer to detecting transients based on time domain samples of decoded audio frame data, Cooke does not describe constructing a replacement signal by weighting and combining those time domain components. Any weighting performed as part of the Cooke interpolation process occurs in the *frequency* domain. See col. 4, lines 28-41 (indicating that contents of frame buffers are "frequency domain samples").

Claims 21, 22, 37 and 39-41

The office action rejected independent claim 21 under § 102(e) based on Cooke. Applicant herein amends claim 21 to include the features of previously dependent claim 38.[2] Those features include matching a window type of the defective transient interval and replacing transform coefficients of the defective transient interval with transform coefficients from the matching non-defective received transient interval. As set forth above in connection with claim 19, Cooke does not teach this feature.

Claims 22 and 37 depend from claim 21 and are thus allowable for at least the same reasons as claim 21.

Claims 39 and 40 have been amended to incorporate the features of claim 21. Each of these claims recites matching the beat type of the defective transient interval and replacing

[2] Applicant notes claim 21 recites "the replacement transform coefficients are obtained from received transient intervals not identified as defective." This language is different from the "replacing ... with ..." language of claim 12, and Applicant accepts the office action's position that the language in claim 21 would encompass obtaining replacement coefficients by interpolation of coefficients from other intervals.

transform coefficients of the defective transient interval with transform coefficients from the matching non-defective received transient interval. As set forth above in connection with claim 32, Cooke does not teach this feature.

Claim 41 has been amended to incorporate the features of claim 21. Claim 41 recites, as to each of the defective transient intervals,

> (e1) replacing transform coefficients for a low-frequency band and for a high-frequency band with transform coefficients from a received transient interval not identified as defective, and
>
> (e2) replacing transform coefficients for a mid-frequency band with transform coefficients from a received interval other than the interval supplying the replacement coefficients in step (e1).

Cooke does not teach this combination of features, and the office action has not pointed to a portion of Cooke teaching this aspect of claim 41.

Claims 23-29

The office action rejected independent claim 23 and its dependent claims 24, 28 and 29 under 35 U.S.C. § 103 based on Davidson in view of Cooke. Claim 23 recites, e.g., a receiving terminal that includes "an error concealment unit for replacing frequency domain transform coefficients of a defective transient audio data interval with frequency domain transform coefficients from a received transient audio data interval found to be error-free." As set forth above in connection with claim 12, such a feature is not taught by Cooke. This feature is also not taught by Davidson. For at least this reason, claim 23 is allowable over Cooke and Davidson (either alone or in combination as proposed by the office action). Claims 28 and 29 depend from claim 23, and are thus also allowable.

The office action rejected claims 25-27 under § 103 based on Davidson in view of Cooke and U.S. Patent 6,477,150 (Maggenti et al., hereinafter "Maggenti"). Applicant has not found (and the office action has not identified) a teaching in Maggenti of "an error concealment unit for replacing frequency domain transform coefficients of a defective transient audio data interval with frequency domain transform coefficients from a received transient audio data interval found to be error-free." Accordingly, claims 25-27 are also allowable over Cooke, Davidson and Maggenti (either alone or in combination as proposed by the office action).

Conclusion

It is respectfully submitted that this application is in condition for allowance. Should the Examiner believe that anything further is desirable in order to place the application in even better form for allowance, the Examiner is invited to contact Applicant's undersigned representative at the below-listed number.

Respectfully submitted,

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